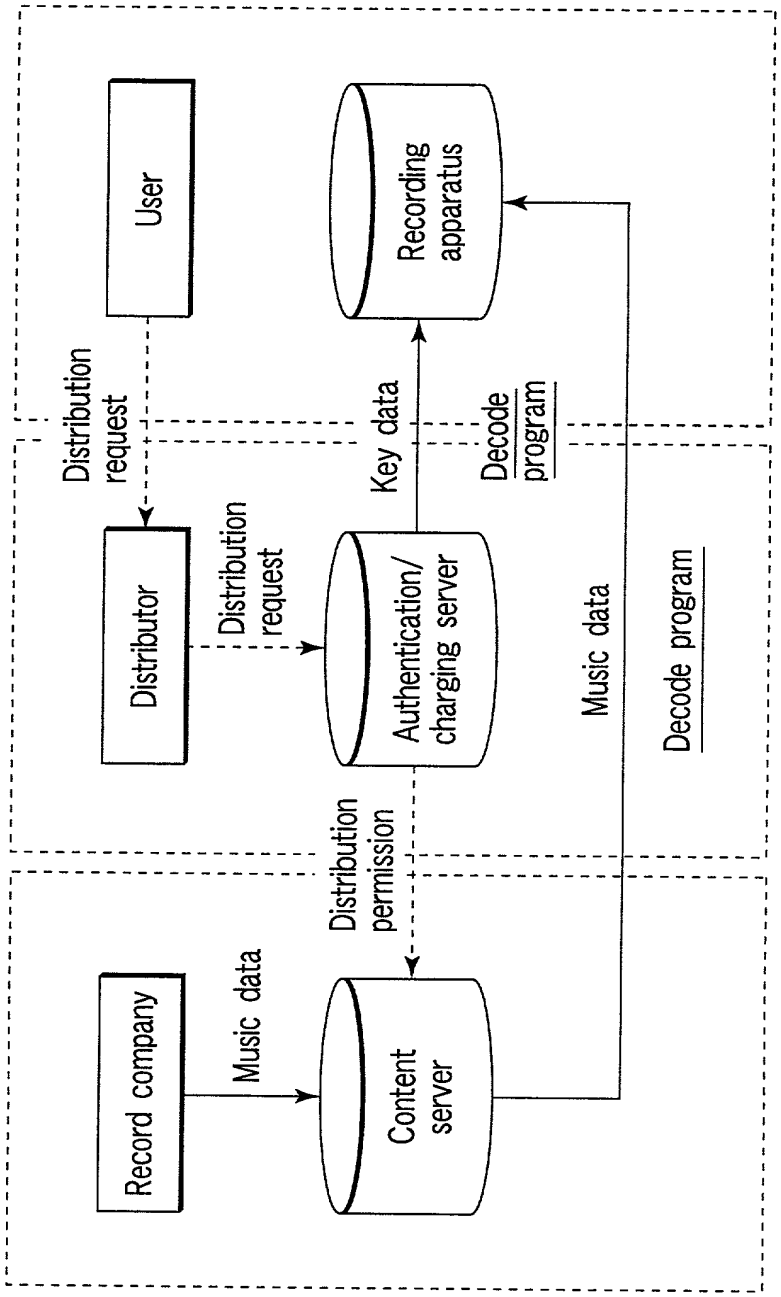
User
Recording apparatus
Distribution request
Key data
Decode program
Distributor
Distribution request
Authentication/ charging server
Music data
Decode program
Distribution permission
Record company
Music data
Content server

FIG. 1

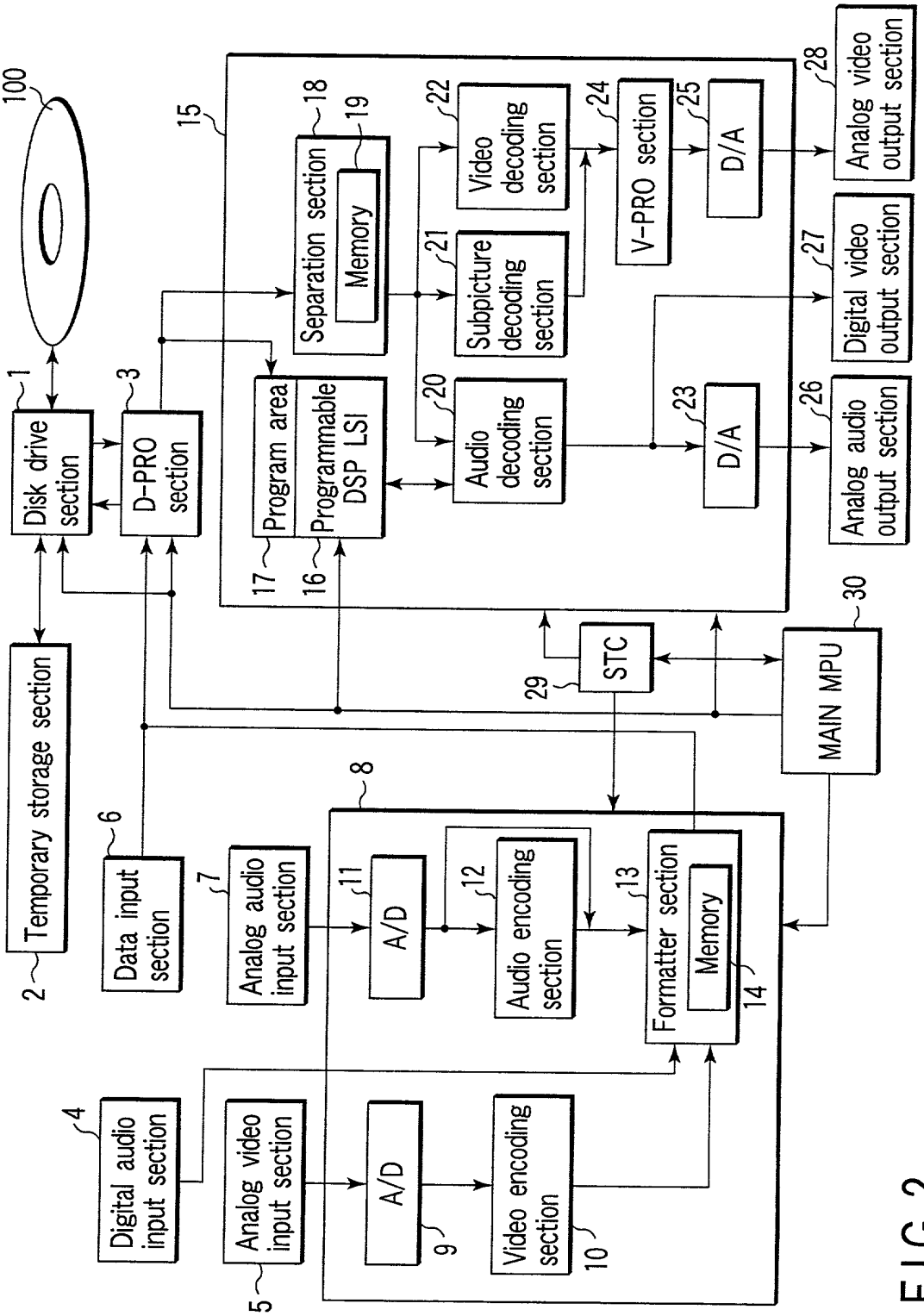
100
Disk drive section
1
D-PRO section
3
Temporary storage section
2
Data input section
6
Digital audio input section
4
Analog video input section
5
Analog audio input section
7
A/D
11
A/D
9
Audio encoding section
12
Video encoding section
10
Formatter section
13
Memory
14
8
15
Separation section
18
Memory
19
Program area
Programmable DSP LSI
17
16
Video decoding section
22
Subpicture decoding section
21
Audio decoding section
20
V-PRO section
24
D/A
25
D/A
23
Analog video output section
28
Digital video output section
27
Analog audio output section
26
STC
29
MAIN MPU
30

FIG. 2

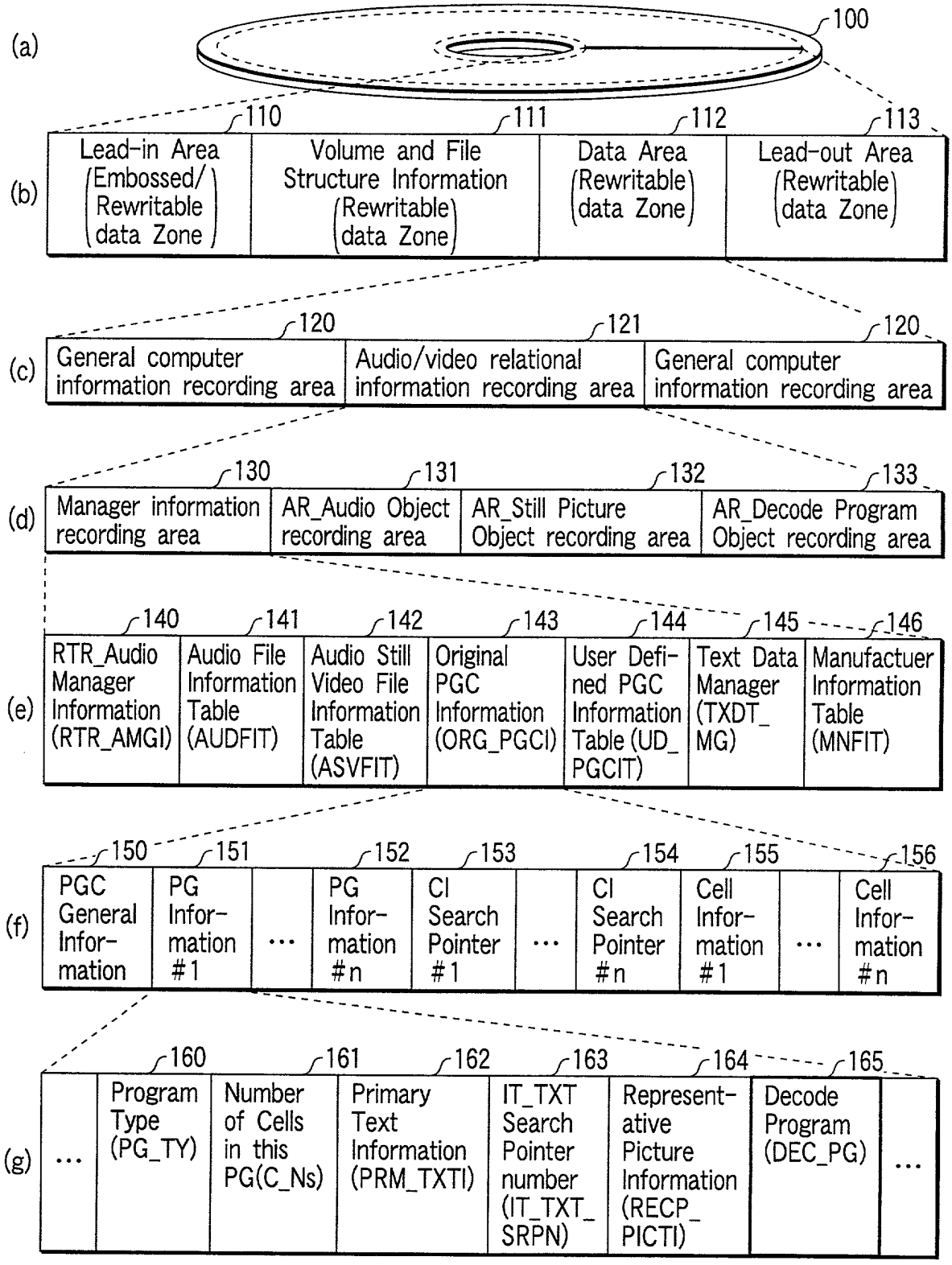
(a)
100
(b)
110
111
112
113
Lead-in Area (Embossed/ Rewritable data Zone)
Volume and File Structure Information (Rewritable data Zone)
Data Area (Rewritable data Zone)
Lead-out Area (Rewritable data Zone)
(c)
120
121
120
General computer information recording area
Audio/video relational information recording area
General computer information recording area
(d)
130
131
132
133
Manager information recording area
AR_Audio Object recording area
AR_Still Picture Object recording area
AR_Decode Program Object recording area
(e)
140
141
142
143
144
145
146
RTR_Audio Manager Information (RTR_AMGI)
Audio File Information Table (AUDFIT)
Audio Still Video File Information Table (ASVFIT)
Original PGC Information (ORG_PGCI)
User Defined PGC Information Table (UD_PGCIT)
Text Data Manager (TXDT_MG)
Manufactuer Information Table (MNFIT)
(f)
150
151
152
153
154
155
156
PGC General Information
PG Information #1
...
PG Information #n
CI Search Pointer #1
...
CI Search Pointer #n
Cell Information #1
...
Cell Information #n
(g)
160
161
162
163
164
165
...
Program Type (PG_TY)
Number of Cells in this PG(C_Ns)
Primary Text Information (PRM_TXTI)
IT_TXT Search Pointer number (IT_TXT_SRPN)
Representative Picture Information (RECP_PICTI)
Decode Program (DEC_PG)
...

FIG. 3

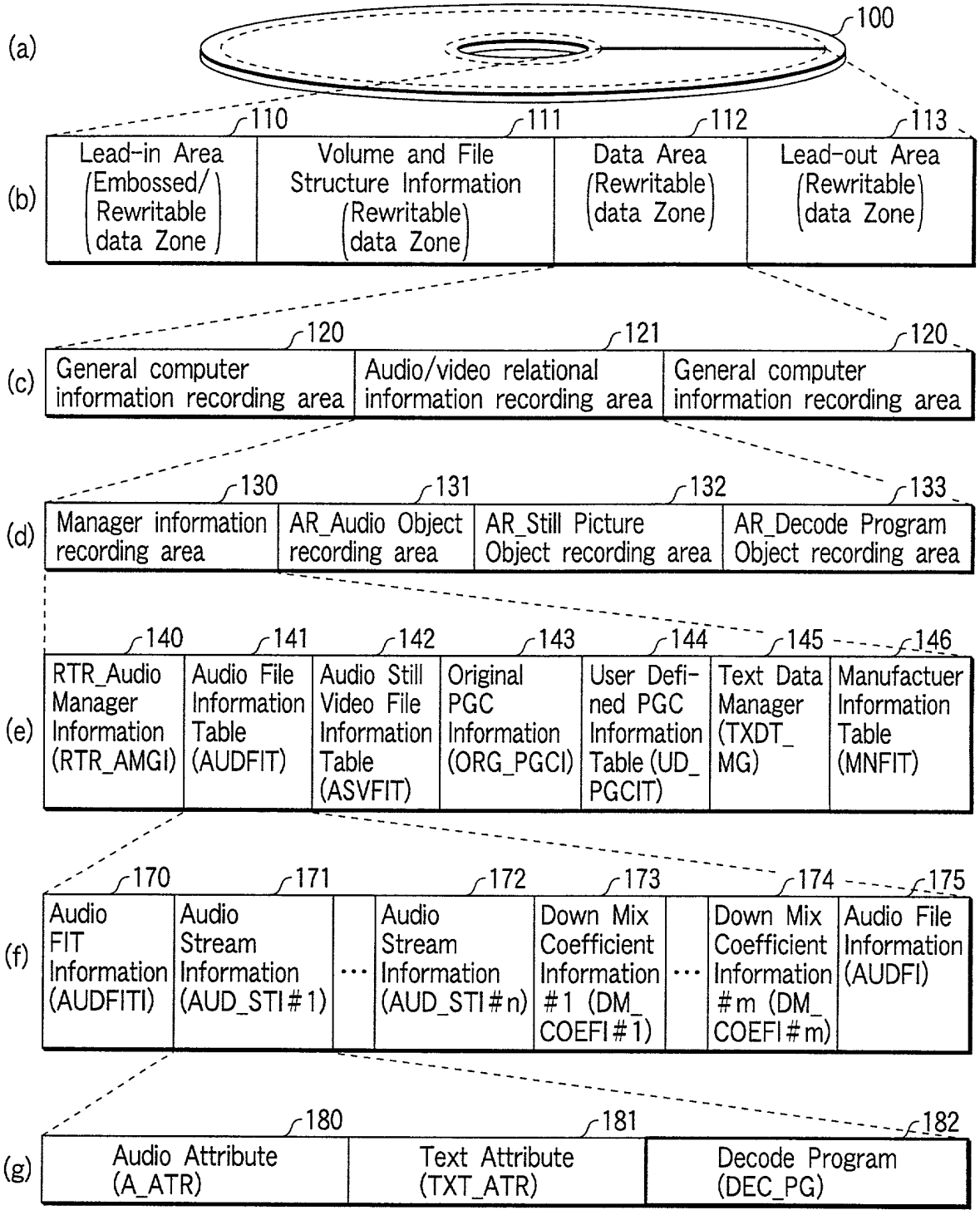

FIG. 4

US 2006/0153529 A1

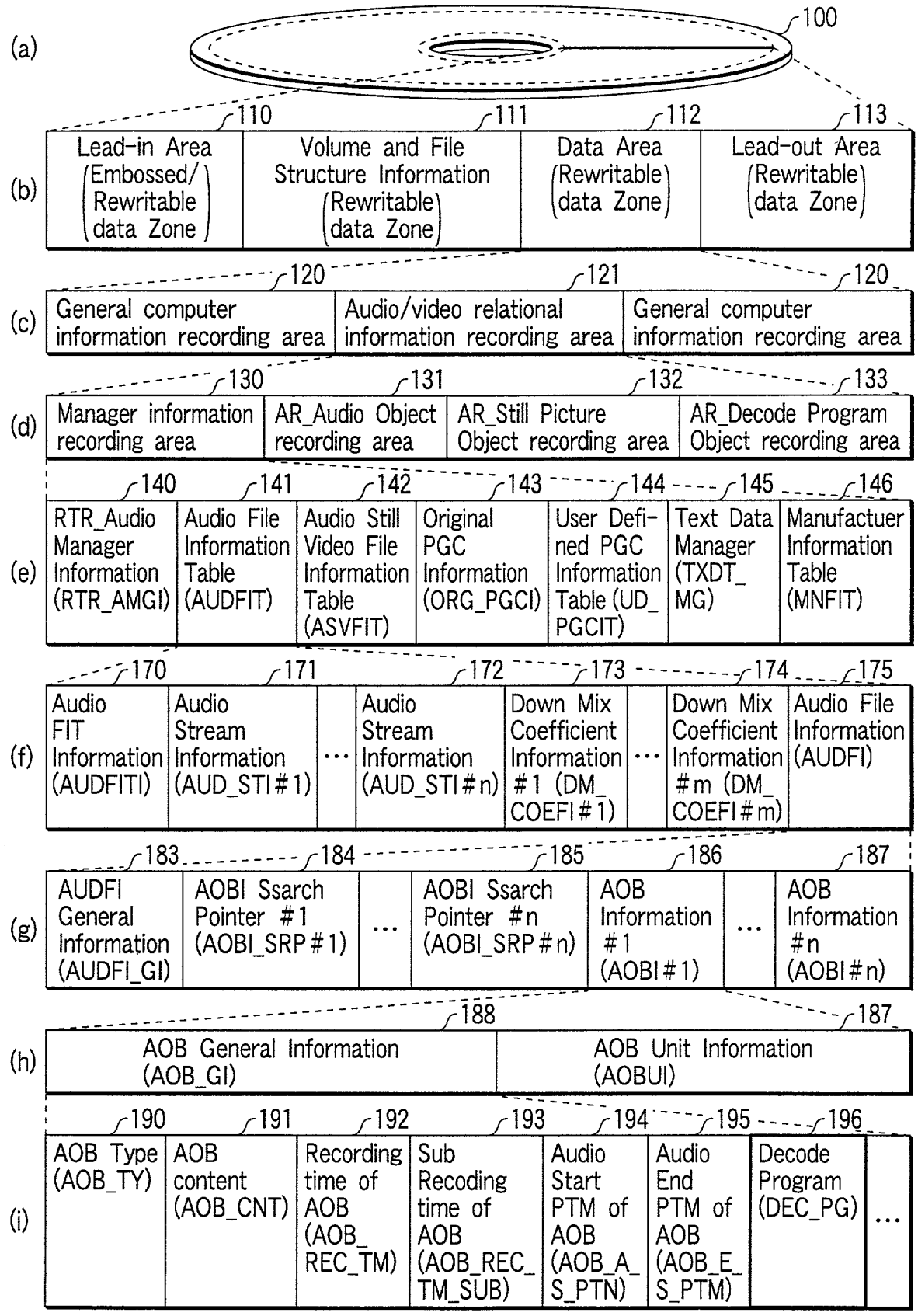

FIG. 5

US 2006/0164956 A1

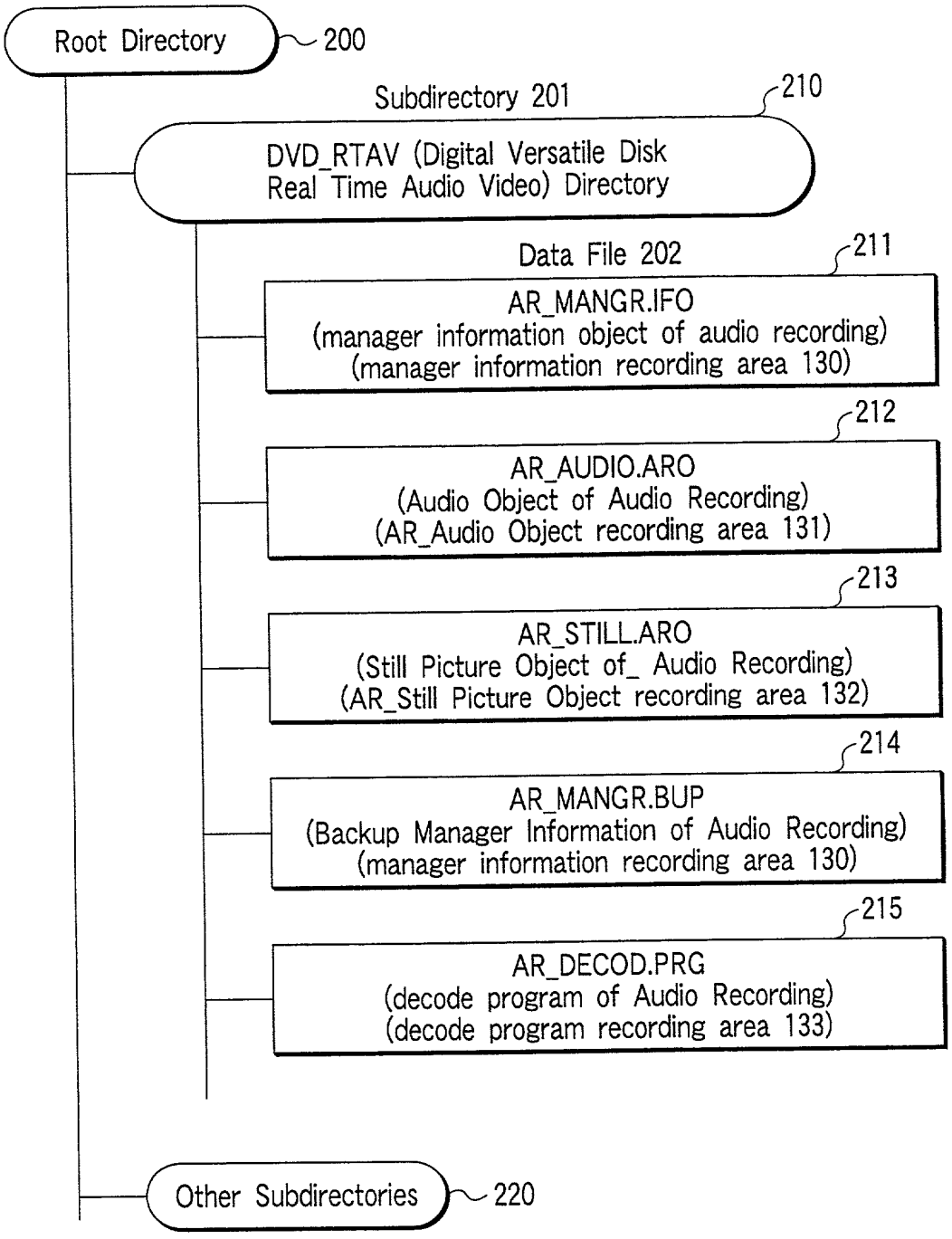
Root Directory
200
Subdirectory 201
210
DVD_RTAV (Digital Versatile Disk Real Time Audio Video) Directory
Data File 202
211
AR_MANGR.IFO
(manager information object of audio recording)
(manager information recording area 130)
212
AR_AUDIO.ARO
(Audio Object of Audio Recording)
(AR_Audio Object recording area 131)
213
AR_STILL.ARO
(Still Picture Object of_ Audio Recording)
(AR_Still Picture Object recording area 132)
214
AR_MANGR.BUP
(Backup Manager Information of Audio Recording)
(manager information recording area 130)
215
AR_DECOD.PRG
(decode program of Audio Recording)
(decode program recording area 133)
Other Subdirectories
220

FIG. 6

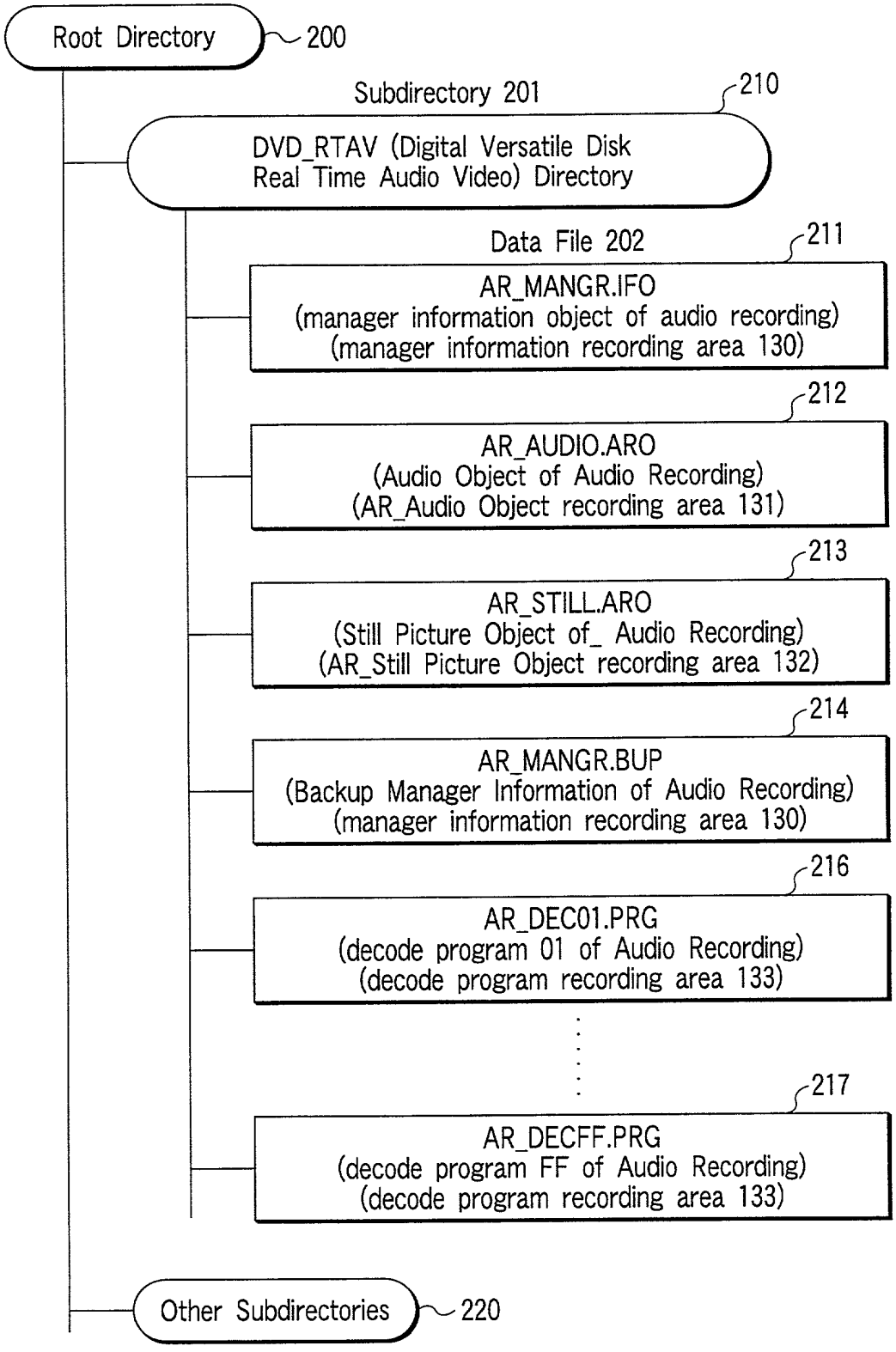
Root Directory
200
Subdirectory 201
210
DVD_RTAV (Digital Versatile Disk Real Time Audio Video) Directory
Data File 202
211
AR_MANGR.IFO
(manager information object of audio recording)
(manager information recording area 130)
212
AR_AUDIO.ARO
(Audio Object of Audio Recording)
(AR_Audio Object recording area 131)
213
AR_STILL.ARO
(Still Picture Object of_ Audio Recording)
(AR_Still Picture Object recording area 132)
214
AR_MANGR.BUP
(Backup Manager Information of Audio Recording)
(manager information recording area 130)
216
AR_DEC01.PRG
(decode program 01 of Audio Recording)
(decode program recording area 133)
217
AR_DECFF.PRG
(decode program FF of Audio Recording)
(decode program recording area 133)
Other Subdirectories
220

FIG. 7

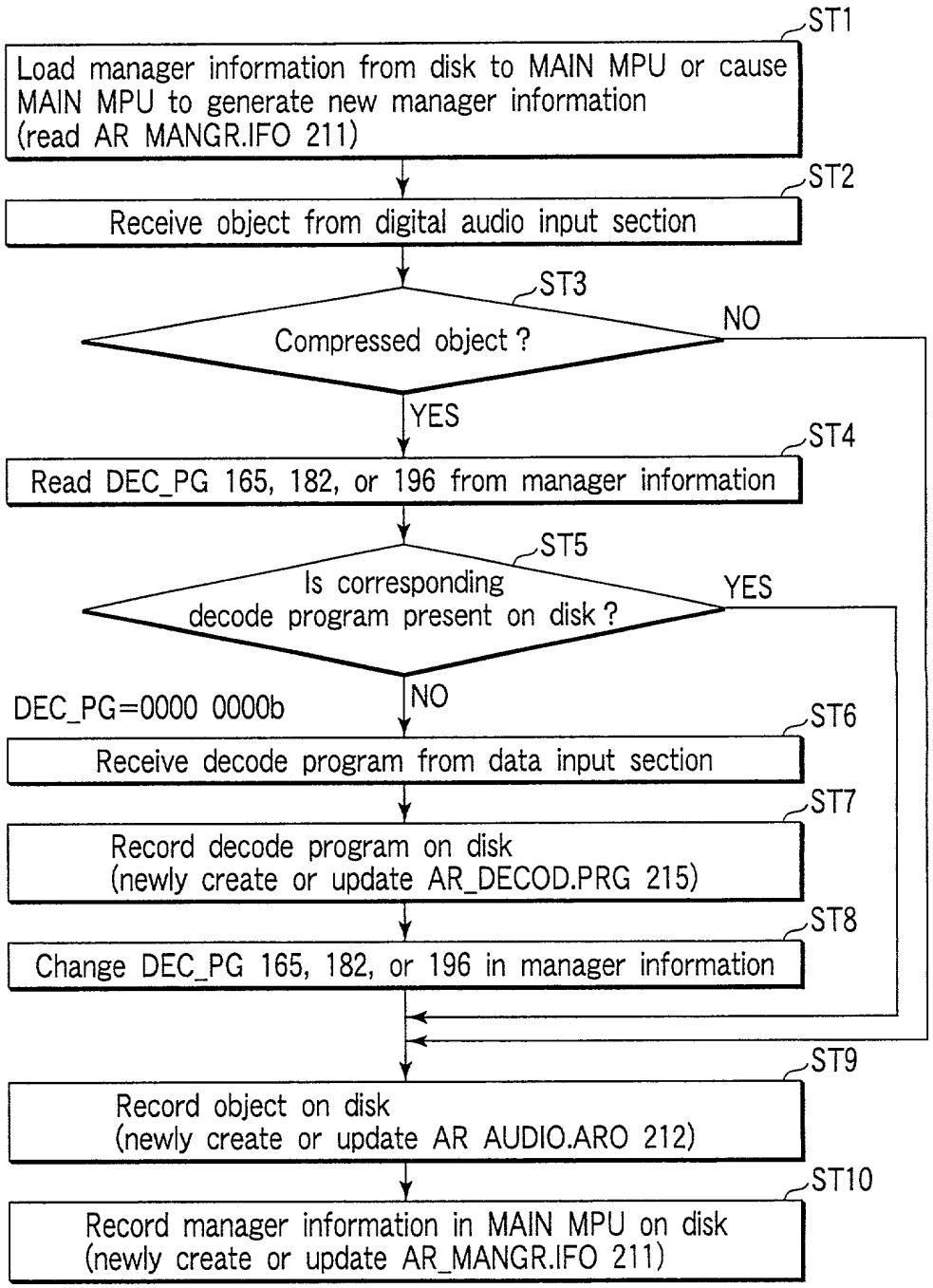
ST1
Load manager information from disk to MAIN MPU or cause MAIN MPU to generate new manager information (read AR MANGR.IFO 211)
ST2
Receive object from digital audio input section
ST3
Compressed object ?
NO
YES
ST4
Read DEC_PG 165, 182, or 196 from manager information
ST5
Is corresponding decode program present on disk ?
YES
DEC_PG=0000 0000b
NO
ST6
Receive decode program from data input section
ST7
Record decode program on disk (newly create or update AR_DECOD.PRG 215)
ST8
Change DEC_PG 165, 182, or 196 in manager information
ST9
Record object on disk (newly create or update AR AUDIO.ARO 212)
ST10
Record manager information in MAIN MPU on disk (newly create or update AR_MANGR.IFO 211)

FIG. 8

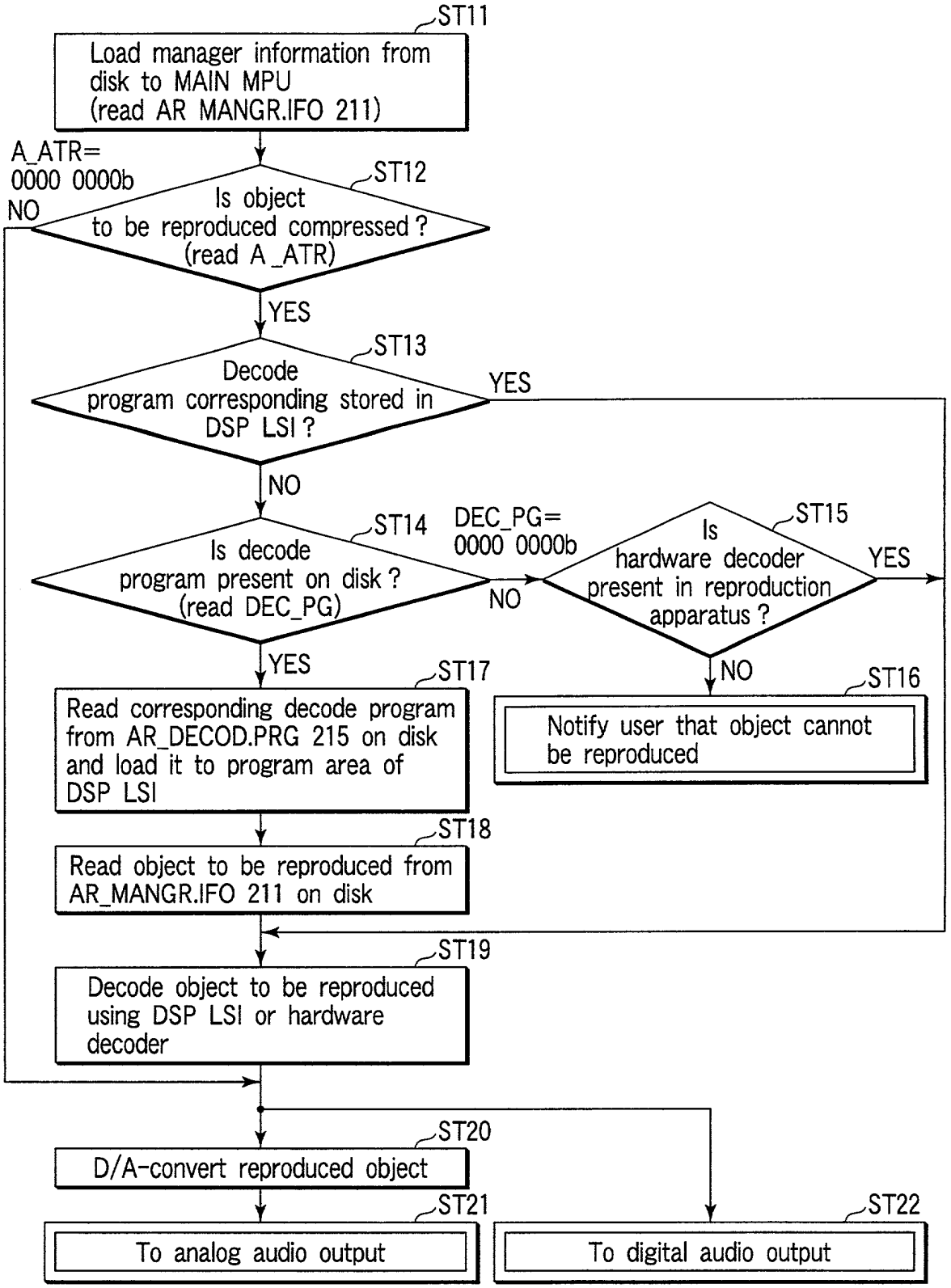
ST11
Load manager information from disk to MAIN MPU (read AR MANGR.IFO 211)
A_ATR= 0000 0000b
ST12
Is object to be reproduced compressed ? (read A_ATR)
NO
YES
ST13
Decode program corresponding stored in DSP LSI ?
YES
NO
ST14
Is decode program present on disk ? (read DEC_PG)
DEC_PG= 0000 0000b
NO
ST15
Is hardware decoder present in reproduction apparatus ?
YES
NO
YES
ST17
Read corresponding decode program from AR_DECOD.PRG 215 on disk and load it to program area of DSP LSI
ST16
Notify user that object cannot be reproduced
ST18
Read object to be reproduced from AR_MANGR.IFO 211 on disk
ST19
Decode object to be reproduced using DSP LSI or hardware decoder
ST20
D/A-convert reproduced object
ST21
To analog audio output
ST22
To digital audio output

FIG. 9

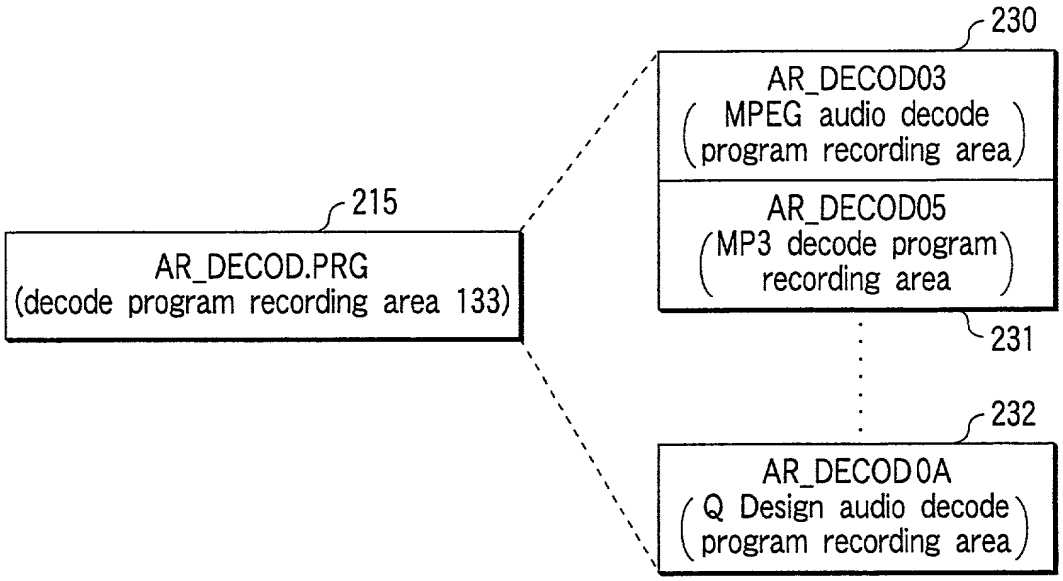
230
AR_DECOD03
(MPEG audio decode program recording area)
AR_DECOD05
(MP3 decode program recording area
231
232
AR_DECOD0A
(Q Design audio decode program recording area)
215
AR_DECOD.PRG
(decode program recording area 133)

FIG. 10

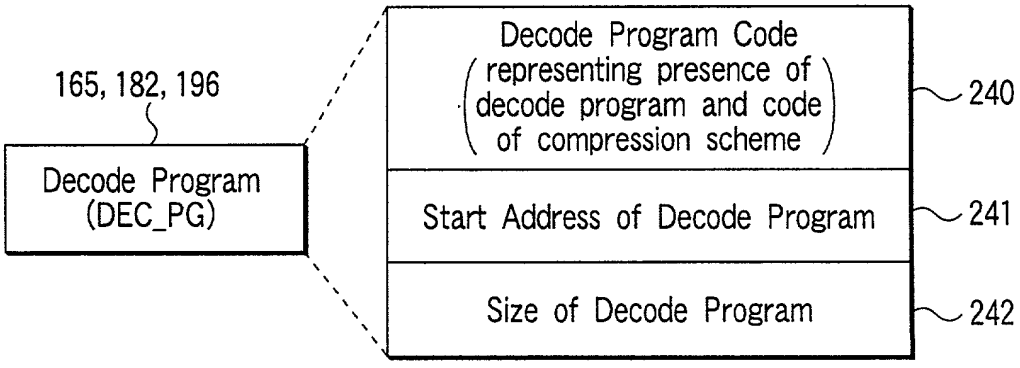
165, 182, 196
Decode Program
(DEC_PG)
Decode Program Code
(representing presence of decode program and code of compression scheme)
240
Start Address of Decode Program
241
Size of Decode Program
242

FIG. 11

0000 0000b	: No program for decode in the disk
0000 0001b	: Packed PCM audio
0000 0010b	: AC-3 audio
0000 0011b	: MPEG audio
0000 0100b	: AAC audio
0000 0101b	: MPEG layer-3 audio
0000 0110b	: ATRAC3 audio
0000 0111b	: WMA audio
0000 1000b	: DTS audio
0000 1001b	: Twin-VQ audio
0000 1010b	: Q Design audio
others	: reserved for other coding mode

FIG. 12

0000 0000b	: This disk has no program for decoding.
0000 0001b	: This disk has the program for decoding.
others	: reserved

FIG. 13

Patent Application Publication